

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

**(19) World Intellectual Property Organization
International Bureau**



A standard linear barcode is located at the bottom of the page, consisting of vertical black bars of varying widths on a white background.

(43) International Publication Date
29 April 2004 (29.04.2004)

PCT

(10) International Publication Number
WO 2004/036302 A1

- | | | |
|--|---|---|
| (51) International Patent Classification ⁷ : | G02F 1/1337,
I/1335 | (74) Agent: DAVIES, P.; D/IP QinetiQ Formalities, Cody Technology Park, A4 Building, Room G016, Ivley Road, Farnborough, Hampshire GU14 0LX (GB). |
| (21) International Application Number: | PCT/GB2003/004483 | (81) Designated States (<i>national</i>): AE, AG, AI, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW. |
| (22) International Filing Date: | 17 October 2003 (17.10.2003) | |
| (25) Filing Language: | English | |
| (26) Publication Language: | English | |
| (30) Priority Data: | | (84) Designated States (<i>regional</i>): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NI, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG). |
| (71) Applicant (<i>for all designated States except US</i>): | ZBD DISPLAYS LTD. [GB/GB]; Malvern Hills Science Park, Geraldine Road, Malvern, Worcs WR14 3SZ (GB). | |
| (72) Inventors; and | | Declaration under Rule 4.17: |
| (75) Inventors/Applicants (<i>for US only</i>): | AMOS, Richard, Michael [GB/GB]; ZBD Displays Ltd., Malvern Hills Science Park, Geraldine Road, Malvern, Worcs WR14 3SZ (GB). BRYAN-BROWN, Guy, Peter [GB/GB]; ZBD Displays Ltd., Malvern Hills Science Park, Geraldine Road, Malvern, Worcs WR14 3SZ (GB). JONES, John, Clifford [GB/GB]; ZBD Displays Ltd., Malvern Hills Science Park, Geraldine Road, Malvern, Worcs WR14 3SZ (GB). WOOD, Emma, Louise [GB/GB]; ZBD Displays Ltd., Malvern Hills Science Park, Geraldine Road, Malvern, Worcs WR14 3SZ (GB). | <ul style="list-style-type: none"> — <i>of inventorship (Rule 4.17(iv)) for US only</i>
 Published: — <i>with international search report</i> — <i>before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments</i> |

Declaration under Rule 4.17:

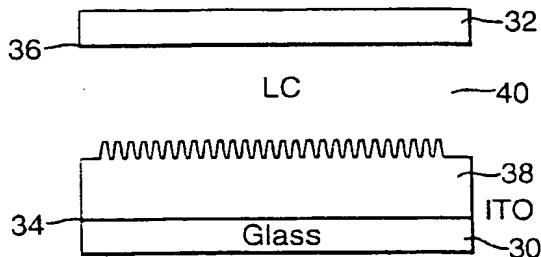
Published:

— with international search report

- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LIQUID CRYSTAL ALIGNMENT LAYER



WO 2004/036302 A1

(57) **Abstract:** This invention relates to a photopolymer mixture capable of use for a liquid crystal alignment layer and to an alignment layer formed from such a photopolymer mixture. The mixture comprises at least two polymerisable materials which are blended together in proportion so as to give a predetermined, preferably low, surface energy. A low surface energy, e.g. less than 4×10^{-2} N/m can result in an alignment layer which imparts a particular orientation to liquid crystal molecules without requiring any post cure treatments. The polymerisable materials may be monomers, oligomers or diluents that form long chain molecules when cured and the mixture may contain additives to lower the overall surface energy.